Rev Econ Household (2014) 12:83–103
DOI 10.1007/s11150-013-9178-9

Children, Kitchen, Church: does ethnicity matter?

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Received: 25 April 2012 / Accepted: 15 January 2013 / Published online: 2 February 2013

Abstract Ethnic differences in the allocation of non-market time are important, as they may shed more light on the integration level of ethnic minorities and on the factors that affect both household productivity and ethnic identity. In this paper we examine the role of ethnicity and gender by analyzing differences in the time spent on a range of activities employing the 2000 UK Time Use Survey. Based on the economics of religion and identity economic models, we hypothesize that if ethnic minority women have lower opportunity costs of time and a strong 'ethnic' or 'traditionally female' identity, they will engage more in 'traditional' home activities. Double-hurdle regression results indicate that while the effect for childcare is not significant when estimated for parents only, non-white women spend significantly more time on food management and particularly religious activities than white women, with the greatest effect of the latter being for Pakistani and Bangladeshi women.

Keywords Time use · Ethnicity · Gender · Religion · UK

JEL Classification J15 · J16 · J22

1 Introduction

The integration of immigrants and ethnic minorities is one of the major concerns in many European countries. An efficient integration of ethnic minority women into

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the labor market is essential for fulfilling the targets of full employment and sustainable growth. In stark contrast to this goal, however, the scientific literature documents that gender differences are often more pronounced among immigrants and ethnic minorities than natives.[1] In the United Kingdom, for example, white immigrants perform comparatively well, or even better, than native-born whites. However, some ethnic minority groups often experience worse labor market outcomes than natives, with Pakistani, Bangladeshi and Blacks being the most disadvantaged groups (Blackaby et al. 2002; Simpson et al. 2006). Women fare particularly badly, with the employment rate of all ethnic minority women being generally much lower than for white natives. The existing literature indicates that this relative disadvantage might originate from cultural and religious differences. As ethnic diversity can be both a 'burden' and a 'potential', it is important to understand the integration and acculturation processes ethnic minorities experience as well as the persistence of ethnicity and factors behind ethnic identities (Zimmermann 2007).

When studying the integration of immigrants and ethnic minorities, economists have usually focused on labor market outcomes or, in other cases, on health, housing decisions, fertility or family formation and structure. With the exception of work hours, immigrants' and ethnic minorities' use of time has not been sufficiently studied by economists (Ribar 2013). However, ethnic differences in the allocation of non-market time are important, as they may shed more light on the integration level of ethnic minorities and on the factors that affect both household productivity and ethnic identity. This paper attempts to rectify this and to fill the gap in the literature by analyzing ethnic differences in the uses of non-market time in the United Kingdom.

An individual's use of time can be viewed as another dimension of individual manifestation of his or her ethnic identity; and as such, there may also be differences between whites and non-whites (and between different non-white minorities) in how non-market time is allocated. It is important to understand how immigrants and ethnic minorities set their time budgets. Since ethnic minorities are likely to have different socio-cultural norms and preferences, gender role attitudes, productivity as well as different costs—including the opportunity costs of time—it is also likely that they will have a different time allocation behaviour. Thus, the way ethnic minorities spend their non-market time may contribute to a better understanding of the factors behind their integration.

Economic integration goes hand-in-hand with social or cultural integration (Constant and Zimmermann 2011; Constant et al. 2012). Ethnic and cultural identity is found to influence (labor market) behavior in a number of recent studies (see, for example, Battu and Zenou 2010; Constant and Zimmermann 2008). The extent of self-identification with the country of ancestry, its culture and religion as well as preferences for ethnic 'goods' depends on a number of socio-economic factors, including family background and structure, social environment, language, immigration and naturalization experience (Battu and Zenou 2010; Bisin et al. 2008).

[1] See, for example, Adsera and Chiswick (2007), Bevelander and Groeneveld (2012), Constant et al. (2006).

Whatever the factors, however, ethnic and cultural identities are found to be extremely strong. For example, Battu and Zenou (2010) report that over 80 per cent in each of the ethnic minority groups in the United Kingdom think of themselves in terms of their own ethnic group. Bisin et al. (2008) find that Muslims integrate less and more slowly than non-Muslims, particularly in terms of religious identity. Muslims (Pakistani and Bangladeshi) in the UK are also found to be 'different' from other ethnic minorities in terms of the gender gap in education, age at marriage, fertility and female employment, although convergence in behavior over time was also found (Georgiadis and Manning 2011). Finally, a considerable heterogeneity across non-white ethnic groups in terms of cultural preferences is also reported (Battu and Zenou 2010), with Pakistani and Bangladeshi being extremely religious compared to other ethnic minorities, which suggests a persistent religiosity impact for these communities (Georgiadis and Manning 2011).

To study the strength of ethnic identity and non-market time allocation behavior of ethnic minorities we employ the UK 2000 Time Use Survey, which allows us to distinguish the exact amount of minutes spent per day on different activities. In particular, we analyze the relation between ethnicity, its interaction with gender and the time spent on different activities. To this aim, we use the double-hurdle regression model, which is particularly well suited for the analysis of time use data. We hypothesize that if ethnic minority women have lower opportunity costs of time and a strong 'ethnic' or 'traditionally female' identity, they will engage more in 'traditional' activities, such as childcare, food preparation and religious activities. Such traditional attitudes presume women's primary role as taking care of children and housework. This can be formulated as the 3 K model, a term that originated in Germany and stands for *Kinder, Küche, Kirche,* that is, Children, Kitchen, Church.[2]

The theoretical literature on the allocation of non-market time and household production goes back to the seminal contributions of Becker (1965), Mincer (1962) and Reid (1934). Becker (1965) extends the standard labour supply model to include multiple uses of time. Households in his model are viewed as both producers and consumers, and they use market goods and time as inputs in their production function to produce commodities. According to this model, individuals' time use in different activities is affected by their wage. As immigrants often have lower wages than natives, there are direct implications for ethnic minorities' uses of time: immigrants would face a low price on time-intensive commodities and also, for a given commodity, substitute time for money (Ribar 2013). Akerlof and Kranton (2000, 2010) extend the standard economic models by introducing identity, or a person's sense of self, into his or her utility function. They show that identity influence labor force participation decisions, allocation of time within the household

[2] The related literature shows that culture and beliefs influence women's labour supply in general, and more traditional attitudes towards gender roles contribute to the explanation of the women's lower labour market outcomes (Fortin 2005; Vella 1994). Cultural considerations appear in research by Antecol (2000), Fernández (2007), Fortin (2005) and Reimers (1985), while gender differences in time use and childcare time are documented in, for example, Jenkins and O'Leary (1997) and Kalenkoski et al. (2005, 2007, 2009) for the United Kingdom. Burda et al. (2007) combine the attitudes literature and time use research and document that in rich northern countries there is no difference by gender in the amount of total work, defined as a sum of market work and household work. They also show that female total work is relatively greater than men's in countries with more traditional attitudes towards jobs.

and the behaviour of ethnic minorities. According to these models, since certain ethnic groups can never fully fit into a majority's culture, some individuals from these excluded groups may try to integrate, but at the cost of a loss in identity. The model predicts that the greater the social exclusion, the greater the possibility that individuals forgo remunerative activity, which leads to a permanent equilibrium of ethnic inequality. Finally, according to literature on the economics of religion (Azzi and Ehrenberg 1975; Chiswick 2010; Iannaccone 1998; Neuman 1982, 1986), if ethnic minorities have lower opportunity costs of time, then they will produce religious commodities in a more time-intensive manner and those with lower wages will spend more time on religious activities.

Three recent studies that focus explicitly on immigrants' and ethnic minorities' time use are particularly relevant for our paper. A recent study by Hamermesh and Trejo (2010) examines the assimilation of immigrants in their uses of time. The authors develop a two-period model of time use of immigrants and test it empirically. Their theory is based on the fact that certain assimilation activities entail fixed costs and predicts that immigrants will be less likely than natives to engage in these activities, but once engaged they will spend more time on them. The authors find support for their theory when analyzing time spent on education, purchasing and market work, using American and Australian Time Use Surveys. The study by Zaiceva and Zimmermann (2011) analyzes the ethnicity gap in multitasking behaviour in UK households and finds that non-white ethnic minorities engage less in simultaneous time use activities than whites, with Pakistani and Bangladeshi men spending the least time on total secondary activities. Ribar (2013) provides an overview of theoretical models of time allocation and their implications for immigrants' behaviour, and reviews the data sources suitable for time use analysis. He also examines studies that used such data to analyze immigrants' behaviour and provides new descriptive evidence using the American Time Use Survey.

This paper contributes to the literature by studying the strength of ethnic identity and traditional attitudes as manifested by time use behavior of ethnic minorities in the United Kingdom. It focuses on the ethnicity gap in the allocation decisions of non-market time, particularly for women. Despite an increasing number of studies based on time use data, more evidence on the role that ethnicity and gender play in non-market time allocation decisions is needed, and this paper provides such evidence for the UK.

The remainder of the paper is organized as follows. Section 2 describes the data and presents descriptive evidence. Econometric methodology is outlined in Sect. 3, and estimation results are presented in Sect. 4. Section 5 discusses the heterogeneity of the ethnicity effect, and Sect. 6 concludes.

2 Data and descriptive evidence

Our empirical analysis uses data from the 2000 UK Time Use Survey (UKTUS). This representative UK household survey was conducted in 2000–2001 and measures the length of time spent on various activities, on the basis of around 250

activity codes. Time diaries were collected for individuals older than eight, which contained information about the nature and location of the activity, and whether anyone else was present during each activity. This information was recorded for every 10-minute interval over 2 days—1 weekday and 1 weekend day. Overall, the UKTUS has 20,981 time diaries from 11,664 people in 6,414 households.

The survey is rich in demographic and socio-economic variables, and contains information on the respondent's ethnicity (white, black-Caribbean, black-African, Indian, Pakistani, Bangladeshi, Chinese). We begin our study by combining all ethnic minorities into one group (non-white), but differentiate between different ethnicities in the subsequent analysis.

The UK time diary records the total time respondents spend per day on the following 11 aggregated activities[3]: personal care/sleep, employment, study, household and family care, volunteer work and meetings, social life and entertainment, sports and outdoor activities, hobbies and games, mass media, travel and other (unspecified) activities.[4] Consistent with other time use studies, the greatest length of time is spent on personal care, of which sleep accounts for the majority. The gender and ethnicity differences here are negligible. There are, however, large differences for the next most time-consuming activities—employment, and household and family care. As expected, while men spend more time on employment, women devote more time to household and family.

Regarding ethnic differences and leaving aside 'other activities', the largest male ethnicity gaps seem to be in time spent on travel and mass media activities. White men spend more time than non-white men on mass media activities, and non-white spend more time on travel. As for employment, non-white men seem to spend relatively more time working than white, and the opposite holds for household and family care. For women, the largest difference is in employment, with white women spending significantly more time working than non-white women. However, non-white women spend substantially more time on volunteer work and meetings, and on household and family care activities. It seems that although ethnic minority women spend less time in employment, this is compensated by more time spent on volunteer work and meetings and household and family care.[5]

In order to understand better on which kind of non-market activities ethnic minority women spend their time, we further disaggregate these two categories. Upper panels of Table 1 show time spent on different household care and volunteer work activities for men and women by ethnicity. It is evident from this table that the largest and significant differences between non-white and white women are in food

[3] Note that here we pool together diaries for a weekday and a weekend day because of the small sample size for ethnic minorities. In an earlier version of this study we disaggregated the analysis by these two types of diary days. However, the differences for our main activities of interest were very small. In the regressions below we pool all observations together and add an additional control for the diary day.

[4] In this study we focus on main or primary activities. The UK time diary also contains information on secondary activities, which are those performed simultaneously with the main or primary activities (see Zaiceva and Zimmermann 2011, for the analysis of ethnic differences in multitasking in the households).

[5] For women, one of the largest gaps also emerges in 'other' time use activities—in particular in the category 'no main activity, no idea what it might be': non-white women spend on average 34 min per day and white women 12 min per day on these unspecified activities.

management and religious activities, with non-white women spending significantly more time relative to white on both (roughly 97 vs. 69 min and 28 vs. 3 min, respectively). If we look at all women, non-white also spend significantly more time than white on childcare (55 vs. 39 min). However, this difference is entirely due to different fertility in the two groups: when focusing on parents only, the difference is no longer statistically significant. The same holds also for men. In addition, non-white men spend significantly more time than white men on religious activities.

Thus, the 'children, kitchen, church' story seems to hold for ethnic minority women in the United Kingdom—at least in the descriptive analysis. These ethnic and gender differences are, however, also due to differences in individual and household characteristics, such as human capital or fertility. In the following sections, we account for this employing econometric regression techniques.

Following the descriptive evidence above, our main outcomes of interest are time spent on food management, religious activities and childcare. Regarding childcare, we focus only on parents in order not to mix together the decision to have a child with decisions regarding time allocation to childcare. Ethnic minorities in the United Kingdom, in particular Pakistanis and Bangladeshis, have higher fertility rates than the white British-born population (Georgiadis and Manning 2011; see also Table 1), and mixing together parents and non-parents may confound the results. This analysis therefore is necessarily descriptive.

We construct a general sample of adults with time diary information, excluding individuals who are younger than 18 and older than 65 years of age, pensioners, full-time students, the long-term sick and disabled, and those for whom the data on the key variables are missing.[6] The set of explanatory variables includes gender, ethnicity, age and its square, marital status, education dummies, employment status, household income dummies and a dummy for missing household income, number of children 0–2, 3–4, 5–9, 10–15 years old, number of adults in the household, region, season, year 2001, and weekend diary dummies. Descriptive statistics for the main variables are reported in the lower panel of Table 1.

Overall, women are on average younger than men of the corresponding ethnicity, and non-white women are the youngest. Regarding ethnic differences, both non-white men and women are significantly younger than their white counterparts. There are also large differences in fertility, with non-white men and women having significantly more children than white men and women. This also holds for the number of adults in the household, with non-whites having on average larger households. The proportion of those who have the smallest household income (<10,430 pounds) is significantly larger for non-white individuals than for whites of each gender, and non-whites are also significantly less likely to be employed than whites of the respective gender. Interestingly, the proportion of individuals with higher education (degree level or below) is also higher for non-whites, while there are fewer individuals with vocational and GCSE level qualifications among the non-whites than whites. The high proportion of skilled individuals among the non-whites may partly reflect Indians constituting the largest immigrant group to the UK, with

[6] Non-white ethnic minorities accounted for 3.6 per cent of men and almost 4 per cent of women in the data. These numbers are somewhat lower than figures from the UK Labour Force Survey.

Table 1 Descriptive statistics

Activities (minutes)	Men		Women	
	White	Non-white	White	Non-white
Household and family care				
Unspecified household and family care	0.543	0.00	0.609	1.883*
	(10.250)	(0.00)	(9.019)	(22.384)
Food management	29.551	23.280++	68.748	96.569***
	(39.132)	(42.462)	(56.834)	(78.472)
Household upkeep	18.880	13.492+	49.003	50.962
	(40.709)	(28.067)	(59.687)	(66.682)
Making and caring for textiles	3.827	3.757	26.200	22.343
	(17.145)	(19.574)	(45.871)	(46.621)
Gardening and pet care	21.417	7.143+++	17.808	4.142***
	(57.466)	(27.796)	(44.351)	(19.767)
Construction and repairs	19.818	13.598	5.536	0 .711**
	(65.587)	(63.696)	(34.764)	(6.475)
Shopping and services	23.751	25.820	39.226	35.481
	(48.932)	(51.643)	(63.315)	(65.955)
Household management	2.591	0.899	2.401	0 .921*
	(15.529)	(5.810)	(13.100)	(7.778)
Childcare of own household members: all	16.015	29.259+++	39.426	54.561***
	(47.169)	(63.342)	(80.523)	(83.619)
Childcare of own household members: parents only	36.388	42.403	79.557	75.906
	(65.514)	(73.034)	(99.067)	(90.350)
Help to an adult household member	0.978	0.370	1.210	5.021***
	(16.299)	(3.321)	(10.442)	(40.696)
Volunteer work and meetings				
Unspecified volunteer work and meetings	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Organizational work	1.979	0.00	2.824	2.008
	(20.299)	(0.00)	(25.690)	(19.232)
Informal help to other households	6.460	0.741++	9.712	6.652
	(35.396)	(5.206)	(41.407)	(36.156)
Participatory/religious activities	3.442	9.947+++	3.767	28.619***
	(23.471)	(32.949)	(23.456)	(62.026)
Religious activities only	2.901	8.413+++	3.005	28.117***
	(22.058)	(29.293)	(20.255)	(62.006)
Explanatory variables				
Age	40.139	36.587+++	39.010	36.197***
	(11.895)	(10.931)	(11.607)	(11.265)
Married or cohabiting	0.771	0.772	0.740	0.724
Number of children <15 years old	0.729	1.429+++	0.845	1.439***
	(1.020)	(1.321)	(1.076)	(1.275)

Table 1 continued

Activities (minutes)	Men		Women	
	White	Non-white	White	Non-white
Number of adults	2.340	2.709+++	2.273	2.816***
	(0.894)	(1.231)	(0.919)	(1.396)
Gross annual household income <10,430 pounds	0.103	0.185+++	0.169	0.285***
Gross annual household income from 10,430 to 55,000 pounds	0.619	0.497+++	0.570	0.439***
Gross annual household income higher than 55,000 pounds	0.092	0.063	0.077	0.067
Gross annual household income missing	0.187	0.254++	0.184	0.209
Employed	0.930	0.868+++	0.787	0.515***
Degree level or higher educ. below degree level	0.276	0.370+++	0.276	0.351**
A level, vocat. levels, O level, GCSE	0.347	0.228+++	0.354	0.255***
Below GCSE/O levels, professional and other qualifications	0.082	0.053	0.056	0.025**
No qualifications	0.296	0.349	0.314	0.368*
Observations	5,102	189	6,076	239

Authors' calculations from the UKTUS 2000 dataset. Notes: Standard deviations are in parentheses. Time spent on different activities includes zero minutes per day. Statistics are calculated for the final sample employed in the regressions. ***, **, * (+++, ++, +) indicates that the mean for non-white women (men) is statistically different from the mean for white women (men) at the 1, 5 and 10 per cent level, respectively

the education profile of these immigrants skewed toward university graduates (de Coulon and Wadsworth 2010). The share of women with no qualifications is marginally higher for non-white than white women.[7] In turn, this may suggest that some of these non-white women are tied movers, while de Coulon and Wadsworth (2010) suggest that the tied mover theory may not apply for Indian women with low education in the UK.

We expect that being employed is negatively correlated with time spent in home production. We also expect the correlation with age to be positive. The greater the number of young children in the household, the more time is expected to be spent on childcare and food management activities—particularly for women. While it is

[7] We construct four education dummies from the harmonized variable for the highest qualification gained, which is available in the original dataset and derived from detailed questions on 23 educational levels and coded into 12 categories as follows: degree level qualification or above; higher education below degree level; A levels, vocational level 3 and equivalent; O levels, GCSE grade A-C, vocational level 2; GCSE below grade C, CSE, vocational level 1; qualification below GCSE/O level; other qualification (including professional); qualifications—but don't know which; qualifications—GCSE—but don't know grade; qualifications—City and Guilds—but don't know level; qualifications—other—but don't know grade/level; no qualifications. Similar education categories for the UK were also used in, for example, Kalenkoski et al. (2007), in their analysis of childcare time in the UK and the US.

difficult to say a priori what the relation between household income or education and time spent on childcare should be, we expect it to be negative for food management activities. Regarding religious activities, women, the less educated, older individuals and non-whites are expected to engage more in these activities, while the relation with income may be concave.[8]

3 Econometric methodology

A distinctive feature of time use data is that a significant proportion of individuals report zero minutes for many activities. To deal with this cluster of observations at zero, different econometric methodologies can be employed, such as the standard Tobit model, the generalized Tobit model and the most general double-hurdle model. The main advantage of the double-hurdle model is that it allows to account simultaneously for two stochastic processes and two types of individuals reporting zeros: those for whom a zero represents a choice (a behavioral zero) and those who report zero due to some other reasons, for example, spending zero minutes on a certain activity during the interview day.[9] This model is particularly suited for the analysis of time use data, where zeros may originate from different sources: for instance, occurrence of an atypical event in a diary date or from a different process determining the decision to participate in a certain activity.

It is recognized in the literature (see, for example, Carlin and Flood 1997; Daunfeldt and Hellström 2007, and the references therein) that the method of time diary data collection results in too many individuals reporting zero minutes of time spent on certain activities, especially if they are performed occasionally (such as religious activities in our case). On the other hand, there may be a different stochastic behavioral process determining the participation decision in a certain activity. For example, the presence of zeros for childcare is closely linked to female fertility (Daunfeldt and Hellström 2007). The decision or biological ability to have children determines the choice between spending time on childcare or not. Even for parents spending time on childcare is a decision, since instead they may decide to buy childcare on the market and use their time on some alternative activities, such as market work. Similarly, spending time for religious activities is linked to individual faith.

[8] Note that fertility, family formation and labour supply decisions can be endogenous. Moreover, decisions regarding how much time to spend on various non-market activities are made jointly with decisions on whether to work in the labour market and if so, how much. Thus the regressors such as household income or employment status are likely to be also endogenous (nevertheless, excluding them from the model did not affect our main results). While one could account for the endogeneity and estimate a more structural model, it is beyond the scope of this paper. Therefore, the results in the tables should be viewed as explorative. Although we take into account some selectivity issues in the econometric modelling, when interpreting the effect of ethnicity one should keep these issues in mind.

[9] Cragg (1971) first presented a version of the double-hurdle model, in which the error terms were assumed to be independent. Jones (1992) derived the likelihood function of the double-hurdle model with dependent errors. More recently, double-hurdle models have been applied to estimate the demand for non-relative childcare (Joesch and Hiedemann 2002), savings and remittances (Sinning 2011), and time spent on different household production activities (Daunfeldt and Hellström 2007).

Thus the corresponding double-hurdle model takes the following form. Let y_i^* be a latent variable for the unobserved propensity to spend time on a certain "traditional" activity, and d_i^* denote a latent equation determining the participation in such activity, then the observed time spent on a certain activity is described as follows:

$$y_i = \begin{cases} y_i^* & \text{if } d_i^* > 0 \quad \text{and} \quad y_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

where $y_i^* = x_i\beta + \varepsilon_i$ and $d_i^* = z_i\gamma + v_i$, and x_i and z_i are the vectors of explanatory variables. The errors in two latent equations are assumed to be distributed normally, and may be correlated with the correlation coefficient ρ. Note that in the double-hurdle model the estimated coefficients have no simple interpretation, and marginal effects have to be estimated in order to achieve interpretable results. Furthermore, in practical applications the inverse hyperbolic sine (IHS) transformation of the observed dependent variable is frequently used (Sinning 2011; Yen and Jones 1997), approximating log (y) for large values of y.

It is important to mention that the majority of studies estimate the double-hurdle model without exclusion restrictions, given the complicated form of the likelihood function and the presence of continuous observations on the dependent variable. In contrast, Jones (1992) advocates the use of the exclusion restrictions in the dependent double-hurdle model. While it is very difficult to find credible instrumental variables for all three uses of time, we have experimented with both specifications, using diary days and season dummies as exclusion restrictions, following Carlin and Flood (1997). Since the results from the models with exclusion restrictions were qualitatively identical and quantitatively similar to the one without exclusion restrictions and since there are still some doubts on the validity of the instruments, we decided to report the latter.

4 Estimation results

Before examining the relation between ethnicity and three non-market uses of time, we also tested the role of ethnicity in the labor market by estimating its effect on the probability of participating in the labor force using the UKTUS dataset and estimating standard regressions. Consistent with the existing literature, we found that white women were substantially more likely to participate in the labor force than non-white women, while the relation was insignificant for men. This indicates that ethnic minority women in the UK tend to spend more of their time outside the labor market, and their allocation of non-market time thus deserves a more detailed analysis. We now turn to this analysis and focus on three non-market activities in which non-white women participate significantly more than whites and for which ethnic differences are the largest: food management, religious activities and childcare.

4.1 Time spent on food management

Table 2 reports marginal effects from the dependent double-hurdle model of ethnicity and gender for the whole sample (left panel) and women only (right panel).

Table 2 Gender and ethnicity effects on time spent on 'traditional' activities: marginal effects from the double-hurdle model

	All			Women		
	Overall	Participation	Level	Overall	Participation	Level
Food management						
Non-white female	0.112	−0.013	0.214***	0.320***	0.020	0.248***
	(0.173)	(0.035)	(0.067)	(0.119)	(0.022)	(0.065)
White male	−1.453***	−0.232***	−0.545***			
	(0.044)	(0.009)	(0.020)			
Non-white male	−2.240***	−0.455***	−0.551***			
	(0.195)	(0.046)	(0.113)			
Religious activities						
Non-white female	0.988***	0.196***	0.011	0.996***	0.202***	−0.104
	(0.195)	(0.039)	(0.188)	(0.195)	(0.040)	(0.207)
White male	−0.031**	−0.006**	0.055			
	(0.0.15)	(0.003)	(0.076)			
Non-white male	0.387***	0.092***	−0.649***			
	(0.111)	(0.026)	(0.174)			
Observations	11,606			6,315		
Childcare (parents only)						
Non-white female	−0.326	−0.067	−0.022	−0.232	−0.045	−0.013
	(0.245)	(0.050)	(0.099)	(0.241)	(0.046)	(0.100)
White male	−1.558***	−0.287***	−0.370***			
	(0.078)	(0.016)	(0.041)			
Non-white male	−1.527***	−0.310***	−0.221*			
	(0.292)	(0.063)	(0.123)			
Observations	5,249				3,016	

Standard errors are clustered by household and are reported in parentheses. Marginal effects are from the IHS dependent double-hurdle model. Controls include age and its square, marital status, number of children 0–2, 3–4, 5–9 and 10–15 years old, number of adults in the household, household income dummies and a dummy for missing household income, education and employment dummies, region, year 2001, season and diary weekday dummies

***, **, * Significant at 1, 5 and 10 per cent

Overall and relative to white women, both white and non-white men spend substantially less time on food management, confirming that gender is an important factor in the time allocation decision for this activity. The large and significant overall effect for men comes from both participation and level equations, as men are generally less likely to participate in food management activities and, conditional on participation, spend less time on them. For women, ethnicity affects how much time is allocated to cooking, as the effect is significant in the level equation only. The overall effect suggests that non-white women spend 32 per cent more time on this activity than white women. The reasons for this large ethnicity gap may range from the willingness and ability to devote time to this activity to cultural preferences due

to different cooking traditions and culture. We hope to shed more light on this in the heterogeneity analysis below.

The coefficient estimates for other covariates for women (not reported, but available upon request) suggest that age and its square have the expected concave profile in the participation equation, but are insignificant in the level equation. Being married or cohabiting positively affects both the length of time spent on food management and the decision to spend time on it. As expected, the number of young children has a generally positive effect, while the number of children 10–15 years old only has a positive effect in the level equation. Also, the larger the number of adults in the household, the less women participate in food management. However, if they do participate, they spend more time on cooking. Women from poorer households generally spend more time cooking, while household income is insignificant in the participation equation. As expected, being employed has an unambiguous negative and significant association with time spent on food management. Women with a higher education degree spend on average less time cooking than those with no qualifications. Finally, the correlation coefficient ρ is highly significant, implying that the errors in the two equations are not independent and the dependent double-hurdle model is the proper specification.

4.2 Time spent on religious activities

Table 2 also shows marginal effects for time spent on religious activities for the whole sample and women. Among whites, overall, men spend 3 per cent less time on religion than women, which is consistent with the economics of religion models. However, non-white men spend 39 per cent more on religious activities than white women, and this positive effect comes from the participation equation: conditional on participating, non-white men also spend significantly less time on religious activities than white women. For women, there is a strong ethnicity effect, with non-white women spending overall twice as much time on religion as white women, and this overall effect is entirely attributable to the participation equation.

The coefficient estimates for the other covariates for women show few significant results (available upon request). Contrary to our expectations, employment is not a significant determinant of time spent on religious activities. The correlation with age is not significant in the participation equation and has a U-shaped profile in the level equation, suggesting that younger and older women spend more time on religious activities relative to the middle-age group. This is consistent with the model in Neuman (1986) and other economics of religion and human capital models, suggesting that the impact of age is minimal at the life cycle stage when wages reach their maximum (note that household income is controlled for in our regressions). Marital status has a negative association with time spent on religion in the participation equation. The number of young children as well as the number of adults in the household positively affects participation in religious activities, while the number of older children (10–15 years old) is marginally significant in the level equation. More children may demand more time devoted to educating and practicing with them religious values and practices, but reverse causality may be also at work here as more religious parents will have more children (Neuman 1986).

Women with GCSE qualifications, vocational education and those with A- or O-level qualifications spend on average fewer minutes on religion than those with no qualifications. The correlation coefficient ρ is again positive and highly significant.

4.3 Time spent on childcare

Table 2 also shows the results for childcare estimated on the subsample of parents. Consistent with the descriptive statistics in Sect. 2, when we focus on parents and mothers only, the effect of ethnicity is insignificant *ceteris paribus*. Thus, differences in time spent on childcare and the larger engagement of ethnic minorities in this activity is entirely attributable to a higher fertility and the presence of children for this group. There is instead a large and significant gender effect with men, both white and non-white, engaging substantially less in childcare activities relative to white women. This negative gender effect holds in both participation and level equations.

As for other determinants (available upon request), coefficients for mothers suggest that age and its square have the expected concave profile, but affect only the participation decision and not the amount of time. As expected, the number of young children has a strong positive effect in both equations, the largest effect being for children under two. In contrast, the number of children between 10 and 15 years old negatively affects the amount of time spent on childcare in the level equation. The greater the number of adults in the household, the less mother participates in childcare activities. As expected, mother's working status is another strong determinant of the time spent on childcare, with a negative correlation in all model specifications used. These results are, in general, consistent with the existing literature on the use of own and paid childcare.[10] In addition, being married or cohabiting marginally and positively affects the decision to spend time on childcare, but not how much time to spend on it, while having a lower household income negatively affects the length of time spent on childcare, but not the participation decision. In contrast, education does not seem to significantly affect time spent on

[10] A significant body of economic literature investigates the determinants of childcare, both formal and informal, public or private, and a large number of these studies have been published in this journal (see, among others, Del Boca et al. 2005; Kalenkoski et al. 2007; van Gameren and Ooms 2009). Several studies by Kalenkoski, Ribar and Stratton investigate childcare determinants in the UK, employing the same dataset as this study. Kalenkoski et al. (2005) estimate the determinants of time spent for primary and secondary childcare and market work by single, cohabiting or married men and women in the UK, finding that single parents spend more time on childcare and less on market work, and that the effect of family structure variables often differs in magnitude for men and women. Kalenkoski et al. (2009) conclude that increases in partner's wages positively affect women's childcare time and negatively affect their market work time, while increases in women's own wages increase their market work. Kalenkoski et al. (2007) analyze the effect of family structure on parents' childcare time and market work time in the UK and the US, allowing for the endogeneity of both living arrangements and the number of children. They find that single mothers and fathers in both countries spend more time on childcare than married or cohabiting parents, and that single parents work more in the US, and less in the UK, than other parents. The authors also find that African American women in the US spend less time on childcare than white women, African American men spend less time on market work than their white counterparts, and hispanic women spend less time on primary childcare in comparison with whites.

childcare for women, which is however in line with the findings in Kalenkoski et al. (2007) for primary childcare of women and using the same dataset. The correlation coefficient of the two error terms is significantly different from zero.[11]

Overall, the strong effect of ethnicity on time spent for religious activities found in this section is in line with the economics of religion models and the fact that ethnic minorities experience lower opportunity costs of time, which is particularly true for women (Azzi and Ehrenberg 1975; Iannaccone 1998; Neuman 1982, 1986). It is also consistent with the literature on ethnic identity (Akerlof and Kranton 2000 , 2010) and with the studies that find a strong religious attachment of ethnic minorities in the United Kingdom (Battu and Zenou 2010; Bisin et al. 2008). The fact that women from ethnic minorities spend more time cooking may also be due to several reasons such as ethnic customs or their lower opportunity cost of time (lower market wage). These differences are important for policy implications, and while not being able to test it directly, we attempt to shed more light on these issues in the next section.[12]

5 Heterogeneity of the ethnicity effect

The results above suggest that ethnicity matters for 'kitchen' and 'church'—for time spent on food management and religious activities. In contrast, it is ethnic differences in fertility that matter for 'children', as the ethnicity effect is not significant in the sub-sample of parents and mothers. But is the ethnicity effect equal for all women? Or are certain groups particularly affected by ethnicity? Table 3 provides some answers. It reports the marginal effects from the double-hurdle models for different socio-economic groups of women. Several interesting facts emerge from this table.

Overall, Table 3 suggests that there is some heterogeneity in the ethnicity effect for women. Regarding food management, there is a strong positive correlation with the non-white ethnicity in the sub-samples of those less educated and those not employed, and the effect is marginally significant for married women. The former

[11] As an additional robustness check (apart from excluding household income and employment), we have also included a variable in the regressions indicating whether a person is a British national. The results were qualitatively identical.

[12] To complete the set of groups, apart from the regressions in Table 2, we have also performed the following comparisons as an additional exercise: non-white male versus white male and non-white female versus non-white male (we are grateful to the anonymous referee for highlighting this). In the first case (males by ethnicity), non-white men were found to devote 41 per cent more time to religious activities than white men, however this overall positive effect was entirely attributable to their higher propensity to participate in such activities. The opposite held for food management, with non-white men participating significantly less in cooking activities than their white counterparts (the overall effect was negative, significant and equal to 66 per cent). No significant ethnic differences for men were found with regards to time spent on childcare. Comparing non-whites by gender, we found that non-white females spent nearly 70 per cent more time on religious activities than non-white men, with the effect being positive and significant in both participation and level equations. As expected, non-white women spent more minutes cooking than non-white men (the effects were quite large and significant in all equations). Regarding childcare, as expected, non-white women were found to spend twice as much time on childcare activities as non-white men, which was entirely attributable to their higher participation in such activities.

Table 3 Heterogeneity of the ethnicity effect for women (non-white = 1): overall marginal effects from the double-hurdle model

	Food management	Religious activities	Obs.	Childcare (mothers)	Obs.
Employed	0.277	0.859***	4906	−0.616	2,082
	(0.199)	(0.245)		(0.412)	
Not employed	0.417***	0.997***	1409	0.182	934
	(0.111)	(0.269)		(0.189)	
Single	0.057	0.891***	1647	−1.919***	587
	(0.430)	(0.324)[a]		(0.633)	
Married or cohabiting	0.167*	0.984***	4668	−0.089	2,429
	(0.094)	(0.218)		(0.256)	
Degree level or higher educ. below degree level	0.298	1.279***	1761	−0.692	755
	(0.204)	(0.394)[b]		(0.531)	
Lower than higher education	0.380***	0.748***	4554	−0.299	2,261
	(0.122)	(0.200)		(0.279)	

Standard errors are clustered by household and are reported in parentheses. Marginal effects are from the IHS dependent double-hurdle model. Controls are as in Table 2 (where relevant)

[a] Without region 11 and region 12

[b] Without region dummies to achieve convergence in the dependent double-hurdle model

***, **, * Significant at 1, 5 and 10 per cent

result seems to indicate that stronger engagement of ethnic minority women in cooking activities may be partially attributable to their lower opportunity cost of time (lower market wage). Of course, there might also be other channels, such as ethnic customs, which we attempt to capture below.

Regarding religious activities, the effect of being non-white is positive and both economically and statistically significant in all sub-samples. Moreover, it is quite homogenous in magnitude, suggesting that non-white women in any group spend roughly twice as much time per day on religious activities as white women. Finally, the only significant effect for childcare is in the sub-sample of singles, suggesting that single non-white mothers spend less time on childcare than single white mothers. Although this result is consistent with the descriptive findings in Duncan and Edwards (1997) that black and white British single mothers have different attitudes towards work and motherhood, with white single mothers viewing motherhood and employment as more incompatible than black single mothers, this result is not very reliable due to the rather small sample size.

It has been documented in the literature that it is important to disaggregate by ethnic group, as there are substantial differences in behavior among them (see Sect. 1). We undertake such an exercise in Table 4, which shows marginal effects from the dependent double-hurdle model for the three time use activities differentiating between Indian, Pakistani/Bangladeshi, Black and Chinese ethnicities. These results, however, have to be interpreted with caution, since the number

Table 4 The effect of different ethnicities on time spent on 'traditional' activities: marginal effects from the double-hurdle model

	Men			Women		
	Overall	Participation	Level	Overall	Participation	Level
Food management						
Indian	0.206	0.030	0.119	0.550***	0.046*	0.356***
	(0.328)	(0.064)	(0.156)	(0.143)	(0.027)	(0.106)
Pakistani/ Bangladeshi	−1.739***	−0.397***	−0.347	0.334**	0.021	0.259**
	(0.247)	(0.069)	(0.218)	(0.158)	(0.030)	(0.122)
Black	−0.879**	−0.183**	−0.257	−0.141	−0.044	0.080
	(0.385)	(0.093)	(0.186)	(0.207)	(0.042)	(0.093)
Chinese	−0.671	−0.220	0.563**	0.674***	0.083**	0.287
	(0.765)	(0.166)	(0.268)	(0.256)	(0.037)	(0.199)
Religious activities						
Indian	0.436***	0.114***	−0.444*	1.271***	0.261***	−0.152
	(0.164)	(0.043)	(0.232)	(0.350)	(0.074)	(0.405)
Pakistani/ Bangladeshi	0.747***	0.204***	−0.626**	1.714***	0.357***	−0.216
	(0.251)	(0.067)	(0.313)	(0.396)	(0.081)	(0.191)
Black	0.113	0.041	−1.016**	0.457*	0.084*	0.295
	(0.131)	(0.039)	(0.410)	(0.273)	(0.051)	(0.235)
Chinese	0.012	0.010	−0.895***	0.114	0.035	−0.958***
	(0.119)	(0.035)	(0.254)	(0.247)	(0.060)	(0.267)
Childcare (parents)						
Indian	−0.265	−0.058	0.021	−0.514	−0.121*	0.116
	(0.289)	(0.058)	(0.120)	(0.408)	(0.071)	(0.198)
Pakistani/ Bangladeshi	−0.135	−0.008	−0.152	0.188	0.069	−0.172
	(0.328)	(0.064)	(0.110)	(0.283)	(0.052)	(0.178)
Black	−0.360	−0.095	0.165	−0.576	−0.128	0.081
	(0.438)	(0.085)	(0.143)	(0.592)	(0.109)	(0.158)
Chinese	0.321	0.050	0.119	0.035	0.040	−0.195
	(0.660)	(0.121)	(0.250)	(0.973)	(0.187)	(0.197)

Standard errors are clustered by household and are reported in parentheses. Standard errors for men for childcare are bootstrapped with 100 replications. Controls are as in Table 2

***, **, * Significant at 1, 5 and 10 per cent

of observations for non-whites disaggregated by ethnic groups and gender is quite small.[13]

The analysis of women's time devoted to food management suggests that the positive effect of the non-white ethnicity found above is attributable mainly to the

[13] The numbers of observations for men in the final sample are as follows: 73 for Indians, 55 for Pakistanis/Bangladeshis, 43 for Blacks and 18 for Chinese; and the ones for women are: 71, 76, 78 and 14, respectively. In the earlier versions of the paper we experimented with pooling together Blacks and Chinese as well as dropping the latter from the analysis. This did not affect the main results.

positive and significant effects for Indian, Pakistani/Bangladeshi and Chinese women. This may be due to different ethnic customs and preferences and different culinary traditions of these ethnic minorities, which require women to spend more time cooking than white women. This is indeed suggested by the significant effect in level equations for Indian, Pakistani and Bangladeshi women (for Chinese women the overall effect is due to their higher participation in food management activities). The overall effect is negative for Pakistani/Bangladeshi and Black men, and it comes entirely from the participation equation, which might be due to different preferences, tastes or gender roles attitudes of Pakistani/Bangladeshi and Black men relative to white men. Regarding childcare, no significant effect (at the 5 per cent level) was found for parents in all ethnic groups.

Table 4 also shows that Pakistani and Bangladeshi are particularly 'different' with respect to time spent on religious activities and the effect is the largest for women. The overall effect is also positive and significant for Indian men and women, with the latter facing the second largest overall effect. The largest effect for Pakistani and Bangladeshi is indeed in line with the recent studies of Bisin et al. (2008) and Georgiadis and Manning (2011), who find that Muslims (Pakistani and Bangladeshi) in the UK integrate less than non-Muslims in terms of religious identity.

This strong ethnicity effect on religious activities may indeed be due to these groups investing more in activities that help them keep their ethnic identity. However, it may also arise from these ethnic minorities belonging to religions that are more time intensive. To test this, one would ideally need to compare time spent on religious activities for ethnic groups in their countries of origin. Unfortunately, such data are not available to us. Nevertheless, to gain more understanding of the role of religion and the persistence of religious identity, we use the World Value Survey, which contains several questions on religiosity for Pakistan, Bangladesh, India and the United Kingdom.[14] Simple tabulations show that over 70 per cent of the respondents in Pakistan attend religious services at least once a week (over 50 per cent attend more than once a week), and the proportion is larger for women. In Bangladesh and India the corresponding proportion is more than 50 (and 30) per cent, respectively. In addition, in Bangladesh nearly 80 per cent of men and over 80 per cent of women reply that they pray to God outside of religious services every day or more than once a week. The corresponding numbers for India are roughly 56 and 67 per cent. Finally, over 80 per cent of men (nearly 90 of women) in Pakistan, nearly 90 per cent of both genders in Bangladesh and nearly 75 per cent in India report being religious. In the UK, on the other hand, roughly 57 per cent of white men and 46 per cent of white women never attend religious services (and almost 20 per cent attend once a year or less), while roughly 56 per cent of South Asian (Indian, Hindu, Pakistani etc.) men and 67 per cent of women attend religious

[14] We use WVS2005 wave for the UK and WVS2000 corresponding to the wave 1999–2004 for other countries (data for the UK are not available in this wave). See European and World Values Surveys Four Wave Integrated Data File, 1981–2004, v.20060423, 2006, the European Values Study Foundation (www.europeanvalues.nl) and World Values Survey Association (www.worldvaluessurvey.org); and World Values Survey 2005 Official Data File v.20090901, 2009, World Values Survey Association (www.worldvaluessurvey.org).

services at least once a week. In addition, 50 per cent of white men (nearly 40 per cent of white women) respond that they are not a religious person, and 13 per cent of men (9 per cent of women) define themselves as 'convinced atheist'. In contrast, roughly 82 per cent of South Asian men and 92 per cent of South Asian women in the UK self-identify as religious. This descriptive evidence seems to suggest that religious and ethnic identity is indeed an important channel behind the strong ethnicity effect for religious activities found above for Pakistani, Bangladeshi and Indian minorities, and in particular women, in the United Kingdom.

6 Conclusions

The existing literature suggests that ethnic identity influences economic outcomes. Therefore, it is fundamental to understand such identity and its effects on economic behavior. An individual's use of time can be viewed as another dimension of the individual manifestation of his or her ethnic identity. And as such, it is expected that there will also be differences between whites and non-whites (and between different non-white minorities) in their allocation of non-market time. These differences are possibly due to different cultural norms and preferences, gender role attitudes as well as different costs, including opportunity costs of time.

Our approach in this paper has been to study the differences in the uses of non-market time between the white majority and non-white minorities in the United Kingdom, based on data from the 2000 UK Time Use Survey. While it is well documented in the literature that non-white ethnic minorities—in particular women—participate less in the labor market, less is known about their non-market time allocation and ethnic differences in such activities. This paper is an attempt to rectify this. Given the low labor market participation of ethnic minority women and their generally lower opportunity costs of time, the role of ethnicity in influencing time spent on traditional female activities was of particular interest. In particular, we elaborate our analysis around the so-called 3 K model: *Kinder, Küche, Kirche* or Children, Kitchen, Church.

We find that ethnicity does matter for the allocation of non-market time. The descriptive statistics reveal that the largest differences between the non-white minority and the white majority for women in the UK are in food management and religious activities, with non-white women spending significantly more time on these activities than white women. There are also large ethnic differences in time devoted to childcare for both men and women. However, these are generally due to ethnic differences in fertility.

Our regression results from the dependent double-hurdle models confirm that, after having controlled for demographic and socio-economic characteristics, ethnicity matters in the expected direction for 'church' and for 'kitchen', but not for 'children', when estimated on a sub-sample of parents. Instead, it is gender that matters for childcare decisions with men of both ethnicities spending less time on childcare than white women. There is also some heterogeneity in the ethnicity effect for women for food management activities, as the effect is present for those not employed and for those with lower education. The effect of ethnicity on time spent

on religious activities is the largest in magnitude and is significant for all socio-economic groups.

Disaggregating by different ethnic groups confirms that there are important differences among ethnic minorities. The overall effect for food management for women is attributable to greater engagement of Indian, Pakistani/Bangladeshi and Chinese women in cooking activities. Taken together with the significant effect found for lower educated women, this suggests that both lower opportunity cost of time (lower market wage) of ethnic minority women as well as ethnic customs and culinary traditions seem to matter for this time allocation decision. Pakistanis, Bangladeshis and Indians are found to be particularly 'different' with respect to time spent on religious activities, and the effect is greater for women, with Pakistani and Bangladeshi women facing the largest overall effect.

The strong effect of ethnicity on time spent for religious activities is in line with theoretical economics of religion and identity economics models and also with the notion that ethnic minorities face lower opportunity costs of time, which is particularly true for women. It is also consistent with the literature on ethnic identity that finds a strong religious attachment of ethnic minorities in the United Kingdom (Battu and Zenou 2010; Bisin et al. 2008). The largest effect for Pakistani and Bangladeshi is also in line with the recent studies of Bisin et al. (2008) and Georgiadis and Manning (2011), who report that Muslims (Pakistani and Bangladeshi) in the UK integrate less than non-Muslims in terms of religious identity. Our own tabulations from the World Value Survey on religious attachment for Pakistan, Bangladesh, India and the United Kingdom seem to confirm that religious and ethnic identity is indeed an important channel behind the strong ethnicity effect for religious activities found for Pakistani, Bangladeshi and Indian minorities, and in particular women in the UK. Overall, our results suggest that ethnic identity may influence the time allocation decisions, particularly for women, which in turn indicates important avenues for the development and implementation of integration policies.

Acknowledgments This is a completely revised version of IZA Discussion Paper No. 3070. Financial support from Volkswagen Foundation for the IZA project on 'The Economics and Persistence of Migrant Ethnicity' is gratefully acknowledged. We would like to thank Dan Hamermesh, David Ribar, Leslie Stratton, Charlene M. Kalenkoski and the participants of the IZA Topic Week 'Nonmarket Time in Economics', the ESPE conference in London, the EEA conference in Milan and seminar participants at the EU Commission for helpful comments and suggestions. We are grateful to Julian Fennema and Mathias Sinning for very useful discussions and for providing us Stata codes for the double-hurdle model. We also thank the Editors and two anonymous referees for very helpful and valuable comments. All errors are ours.

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